

REPORT

---

***Former Plainwell Impoundment  
Treatability Study Work Plan***

EPA Region 5 Records Ctr.



392540

**Allied Paper, Inc./Portage Creek/  
Kalamazoo River Superfund Site  
Kalamazoo and Allegan Counties,  
Michigan**

**May 14, 2004**

**BBL**<sup>®</sup>  
BLASLAND, BOUCK & LEE, INC.  
engineers, scientists, economists

# Table of Contents

---

<b>Section 1. Project Description .....</b>	<b>1-1</b>
1.1 General .....	1-1
1.2 Pilot Test Objectives .....	1-2
1.3 ARARs .....	1-2
<b>Section 2. Approach.....</b>	<b>2-1</b>
2.1 Technology Description.....	2-1
2.2 Design and Procedures.....	2-1
2.3 Residuals Management .....	2-3
2.4 Equipment and Materials .....	2-3
<b>Section 3. Sampling and Analysis.....</b>	<b>3-1</b>
3.1 Data Management .....	3-2
3.2 Data Analysis and Interpretation .....	3-2
<b>Section 4. Plans and Reports .....</b>	<b>4-1</b>
<b>Section 5. Project Management.....</b>	<b>5-1</b>
5.1 Management and Staffing .....	5-1
5.2 Schedule .....	5-1
5.3 Community Relations.....	5-1
<b>Section 6. References .....</b>	<b>6-1</b>

## Table

Table 1 - Treatability Study Work Plan Potential Federal and State ARARs and TBCs

## Figures

Figure 1 – Riverbank Stabilization Pilot Project Options 2 – 5  
Figure 2 – Riverbank Stabilization Pilot Project Option 2  
Figure 3 – Riverbank Stabilization Pilot Project Option 3  
Figure 4 – Riverbank Stabilization Pilot Project Option 4  
Figure 5 – Riverbank Stabilization Pilot Project Option 5  
Figure 6 – Design Concepts for Bank Stabilization  
Figure 7 – Organization Chart

## Attachments

A Former Plainwell Impoundment Treatability Study Work Plan Project Schedule  
B Scope of Work for Geotechnical Sampling and Analysis

# ***1. Project Description***

---

## **1.1 General**

This Work Plan describes the proposed riverbank stabilization treatability study (Treatability Study) to be conducted by the Kalamazoo River Study Group (KRSRG) within a portion of the former Plainwell Impoundment area of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site (Site). The proposed bank stabilization Treatability Study program involves construction of bank stabilization measures along a selected length of the Kalamazoo River in Allegan County, Michigan. Four candidate areas for the Treatability Study were evaluated and one will be selected for the project (Figure 1). The study will evaluate implementability aspects of two different bank stabilization designs. This study is intended to provide information to the U.S. Environmental Protection Agency (USEPA) regarding riverbank stabilization technologies to reduce uncertainty in the identification and selection of an appropriate remedy for this area of the Site.

Consistent with the USEPA's sediment management principles (OSWER, 2002), the Treatability Study will demonstrate methods to control a significant source of PCBs to the river – the riverbank deposits in the former impoundments. The Treatability Study design will involve the coordinated input of stakeholders including the USEPA, U.S. Fish and Wildlife Service (USFWS), National Oceanic and Atmospheric Administration (NOAA), Michigan Department of Environmental Quality (MDEQ), Michigan Department of Natural Resources (MDNR), and Michigan Office of the Attorney General.

The Work Plan is intended to guide the overall development of the Treatability Study by:

1. Defining the project objectives;
2. Identifying the methods for the Treatability Study program;
3. Determining the regulatory constraints (i.e., applicable or relevant and appropriate requirements, ARARs) on the construction project;
4. Describing the various plans that will be submitted for review and approval by the USEPA;
5. Identifying roles and lines of authority for key technical and management personnel involved with the study; and
6. Identifying the tasks and schedule necessary to complete the construction activities during the 2004 construction season.

---

## **1.2 Pilot Test Objectives**

The primary objective for the proposed Treatability Study is to evaluate the implementability of constructing bank stabilization measures "in the wet" at a scale designed to simulate large-scale operations. Secondary objectives are to:

1. Obtain field observations and PCB data identified by USEPA to address, in part, the environmental impacts and effectiveness of the construction of bank stabilization measures (Section 3);
2. Evaluate methods to improve riparian habitats and fish/benthic habitats;
3. Generate production and construction data sufficient to develop more definite cost estimates and schedules for large-scale implementation; and
4. Allow assessment of the overall aesthetics of the different measures.

The study is *not* designed to evaluate reduction in PCB flux (effectiveness) or to thoroughly evaluate performance with respect to other National Oil and Hazardous Substances Pollution Contingency Plan (NCP) assessment criteria. However, the data collected in satisfying objectives 1-3 above may be useful in assessing short-term effectiveness of construction "in the wet" and long-term effectiveness aspects of the designs and potential risk reduction.

## **1.3 ARARs**

The Treatability Study will be constructed in compliance with Federal, State, and local applicable or relevant and appropriate requirements (ARARs) to the extent practicable and items to be considered (TBCs) for the Treatability Study, identified in Table 1. The Treatability Study will be conducted by the KRSG with the oversight of the USEPA in accordance with an administrative order by consent to be executed pursuant to CERCLA. Per the provisions of CERCLA Section 121(e)(1), performance of the Treatability Study will be exempt from the administrative aspects of Federal, State, or local permit requirements. Substantive compliance with otherwise applicable permit requirements will be documented in a Substantive Requirements Document to be submitted separately.

## **2. Approach**

---

### **2.1 Technology Description**

Riverbank stabilization measures are intended to stem the supply of PCBs to the Kalamazoo River from riverbank deposits of eroding sediments that were exposed when the pool elevation of the former Plainwell Impoundment was lowered approximately 35 years ago.

Two different bank stabilization designs will be constructed: one that uses geoweb filled with stone/gravel/soil (Geoweb design), and a second that uses stone and fabric-encapsulated soil lifts (FES design). The FES design includes excavation of bank soils and sediments prior to placement of the soil lifts on the bank. The Geoweb design entails removal of soils above the water line to the extent necessary to achieve target design slope for the banks prior to placement of the Geoweb on top of the bank slopes. Both designs incorporate bioengineered habitat, with the FES design ultimately relying upon deep-rooted vegetation to maintain the integrity of the riverbanks. Other habitat improvements as well as recreational amenities (e.g., observation deck, waterfront trail) will be incorporated in the project design.

The Geoweb and FES designs are described in greater detail in the following section.

### **2.2 Design and Procedures**

One of four candidate areas within the former Plainwell Impoundment has been tentatively selected to perform the Treatability Study. The locations of the four areas are shown on Figure 1. The four candidate areas were identified based upon considerations of accessibility for public viewing and the potential hydraulic impacts of the stabilization measures to adjacent bank sections and the opposite riverbank. Areas were sought that could be easily accessed by the public for viewing and where the project would have a low risk of increasing loading of PCBs from adjacent banks or the opposite riverbanks. Figures 2 – 5 show the approximate layouts of access roads and ground-level photographs for each of the areas. The area identified as Option 3 is preferred for the pilot project; however, final selection will depend on the ability to arrange access with the landowners.

Approximately 800 feet of riverbank would be stabilized, half using the Geoweb design and the other half using the FES design. The positioning of the two and construction sequence are yet to be determined. The basic design and construction features of the Geoweb and FES approaches are described below.

---

**Geoweb.** The basic design concepts of the Geoweb approach are illustrated in Figure 6a. Prior to the placement of the geoweb, silt curtains would be deployed in the river and bank slopes would be regraded as necessary to achieve a 3(H):1(V) slope. Excess soils from regrading and soils with insufficient strength would be removed and appropriately disposed. A 6-inch geoweb would be placed on the bank and filled with gravel or stone. The geoweb would extend over the top of the bank and extend into the river a distance necessary to protect the toe of the bank from undercutting. A bioengineered bank will be placed on top of the filled geoweb. The bioengineered bank could incorporate installation of bio-logs at the waterline, placement of top soil, as well as planting and seeding of various native plant species, deep-rooted shrubs, and four to five rows of mixed younger and older trees within the interstices of the exposed areas of the geoweb.

**FES.** Prior to placement of the FES design (Figure 6b), the river bank would be cut back a minimum of five feet (i.e., from top of bank and from toe of bank, a horizontal distance of five feet). Additional soils/sediment would be removed to achieve a maximum slope of 3:1. All of the excavation would be conducted from the land after a system of two silt curtains is deployed in the river. In addition to excavation of the riverbank, the top two feet of soil would be removed from the area along the 400-foot section, a distance of approximately 30 feet from the river. Removed soils and sediments would be appropriately disposed. A new river bank would be constructed within excavated area. A stone foundation having a minimum width of five feet and a thickness that brings the stone layer to within six inches of the water surface would be placed at the toe. Above the stone foundation, lifts of fabric-encapsulated soil would be placed having minimum widths of five feet. The fabric-encapsulated soil lifts would be anchored by stakes and ultimately by plantings of deep-rooted vegetation that would be placed through the surface of the fabric.

In the interest of efficiency and an expedited schedule, a design-build approach to construction will be followed. This approach does not require the preparation of detailed plans and specifications for bidding. The design will consist of planimetric maps of the project, with pertinent design information and typical cross sections and profiles showing the current and design bank slopes and material specifications.

The design process will include a relatively early submittal to USEPA and the agency trustees to provide the opportunity for early feedback on the design of habitat measures.

The work site and surrounding area will be surveyed to provide Site-specific information needed for design. Geotechnical information such as moisture content, bulk density, particle size, Atterberg limits, and shear strength will be collected to evaluate soil and sediment strength and compaction characteristics in the planned

---

locations of the access roads and staging areas, and submerged and exposed slopes to be stabilized. Marsh, tree-shrub (including upland forest, shrub land, and forested wetlands), and marsh-tree-shrub areas will be delineated and flagged in the field for reference. Silt fences and other erosion and sedimentation controls will be installed prior to clearing the Site of obstructing vegetation. Special effort will be made to identify and locate undesirable plant species prior to clearing to eliminate them in a manner that minimizes their ability to reproduce in the restoration areas. Access roads will be constructed to, and along, the edge of the river to create a means for vehicular entry to the work area and provide a platform for construction equipment. A staging area will be constructed to include materials handling and storage, vehicle parking, and a truck wash/decontamination area. Culverts and other temporary and/or permanent water diversion structures will be installed concurrently with the access roads to manage surface water from tributaries and overland flow during construction activities.

Habitat measures may include native herbaceous plants and woody shrubs by seeding, live staking, plant plugs, and potted/balled trees, per plans to be detailed in the Design Document. Following construction of the bank stabilization and riparian habitat measures, the access roads and support areas will be restored.

## **2.3 Residuals Management**

Saturated soils and sediments generated during excavation and regrading activities will be dewatered prior to transport for disposal. Water collected during dewatering operations will be treated on-site and discharged to the river. Vegetative debris from clearing will be reused as needed for habitat enhancements at the work site, and excess materials transported to an off-site solid waste disposal facility. Root wads and materials that are not free of soil or sediment would not be reused. Although the majority of this material will likely contain total PCB concentrations below 50 ppm, analytical data for soil samples collected along the banks of the candidate Treatability Study locations indicate some portion may contain PCB concentrations above the 50 ppm TSCA regulatory threshold. Arrangements will be made to transport these soils to a solid waste or TSCA-regulated facility, or disposed of in one of the Site's operable units, if determined by USEPA to be appropriate.

## **2.4 Equipment and Materials**

Equipment and materials to be used for the proposed Treatability Study will be specified in the Design Document. The information to be provided will include a list of equipment and the types and quantities (areas, volumes, capacities) of materials to be used in conducting the bank stabilization program. The riverbanks will be stabilized using land-based construction equipment.

### ***3. Sampling and Analysis***

---

The Design Document will include a monitoring plan that will describe the sampling and analysis to be conducted in support of the Treatability Study. Observations, inspections and measurements will be made to:

- Confirm that the stabilization and habitat measures are implemented as designed (e.g., adequate thickness and coverage of stabilization materials; proper measures for revegetation);
- Verify that controls are functioning properly and document substantive requirements with ARARs (e.g., erosion and sedimentation control requirements);
- Document post-implementation conditions to track performance over time (e.g., revegetation of riparian land; recolonization of sediment by benthic organisms); and
- Satisfy the objectives and data needs identified and discussed with USEPA that relate to assessing the environmental impacts and effectiveness of constructing bank stabilization measures.

Based upon discussions with USEPA, the following sampling observation and analyses needs and activities have been incorporated into the work plan.

1. Assess PCB distributions in soils and sediments and associated soil and sediment volumes through the analysis of cores taken at the following areas and times:
  - a. along the toe of the riverbank where bank stabilization measures will be constructed, prior to construction;
  - b. along the toe of the river bank in areas where the toe has been excavated, before backfilling;
  - c. in areas of floodplain soil where soils have been excavated to assess residual PCB distribution; and
  - d. in areas of floodplain soil that will not be excavated but will be covered with clean materials as a result of construction.
2. Assess potential increases in PCB concentrations in the Kalamazoo water column outside of the containment area that are attributable to construction activities. Samples would be collected routinely at locations upstream and downstream of the containment area at points that appear to represent cross-sectional average conditions. In addition, at the discretion of USEPA oversight personnel, samples may be collected from turbidity plumes if seen emanating from the containment area.



- 
3. Assess the levels of PCB in sediment that deposits within the construction containment area and approximate the amount of sediment that deposits within the construction containment area using sediment traps.
  4. Assess the impacts of the stabilization structures on the adjacent stream banks and bathymetry by documenting conditions in these areas upon completion of construction and during summer 2005.

A Sampling and Analysis Plan (SAP), consisting of a Field Sampling Plan (FSP) and a Quality Assurance Project Plan (QAPP) will be developed. The level of QA/QC will be identified, and the types and quantities of QA samples to be collected will be tabulated.

### **3.1 Data Management**

The existing RI/FS Data Management Plan (DMP) (BBEPC, 1993c) identifies the procedures to be used for recording observations and data in the field and laboratory, including field notebooks, field forms, and photographs. The Design Document will reference these procedures, and any modifications required for Treatability Study data management.

### **3.2 Data Analysis and Interpretation**

Data collected for the Treatability Study will be compiled and analyzed. The new information will be incorporated into a detailed analysis of the bank stabilization in a feasibility study (FS).

## 4. Plans and Reports

---

The following project deliverables will be prepared and submitted to the USEPA for the proposed bank stabilization Treatability Study:

- *Treatability Study Work Plan* (this Work Plan) – presents the objectives, general approach, schedule, and management of the Treatability Study.
- *Treatability Study Design Document* – presents the engineering design, monitoring plan, operations and maintenance plan, and data management practices to be conducted in support of the Treatability Study, referencing the existing RI/FS SAP (BBEPC, 1993a,b) and DMP (BBEPC, 1993c), and modifying or adding methods and procedures, as appropriate.
- *Health and Safety Plan* – outlines the practices to be followed to address potential hazards associated with the Treatability Study. The Treatability Study Health and Safety Plan (HSP) will reference the existing RI/FS HSP (BBEPC, 1993d).
- *Substantive Requirements Document* – describes how the Treatability Study will be conducted to meet the substantive requirements of permits.
- *Treatability Study Report* – data collected for the Treatability Study will be compiled and analyzed, and the new information will be incorporated into the forthcoming FS.
- *Sampling and Analysis Plan* – consisting of an FSP and a QAPP. These plans will present field and laboratory methods and quality control procedures that will be used to assure the quality of data collected during the treatability study.

## **5. Project Management**

---

### **5.1 Management and Staffing**

Key management and technical personnel associated with the proposed Treatability Study program, identifying general roles and responsibilities, are presented in the organization chart in Figure 7.

### **5.2 Schedule**

The preliminarily identified tasks and timeframes for conducting the Treatability Study are presented in Attachment 1. This expedited schedule was prepared with the goal of completing the stabilization work within the 2004 construction season. Tasks that are critical to the timely completion of the project are shown in red. Critical path tasks to be conducted prior to construction activities consist of the production and agency review/approval of the Substantive Requirements Document. Some of the critical path tasks, such as clearing and regrading of the work area, vary significantly depending on the candidate location. The length of time required to complete these tasks will be further refined upon selecting and arranging access to a preferred location.

Under this expedited schedule the period of construction nonetheless extends into mid-October, leaving little time for schedule slippage. Furthermore, the timeframes for completing the critical pre-construction tasks are relatively short, and assume a high degree of cooperative interaction among the KRSG, USEPA, and other trustee agencies. Should these tasks require more time than shown, the construction period may continue into the late fall, which is to be avoided if possible.

Construction must begin by July 5 for the project to be constructed this construction season. If construction cannot begin by July 5, the project will be postponed until the 2005 construction season.

### **5.3 Community Relations**

Community relations activities associated with the Treatability Study will be managed by the USEPA. These activities may include preparation of fact sheets and news releases, holding community meetings, and providing related information for repositories. The KRSG will support the USEPA's community relations efforts.

## 6. References

---

- BBEPC. 1993a. *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site – Remedial Investigation/Feasibility Study Field Sampling Plan* (Syracuse, NY: July 1993).
- BBEPC. 1993b. *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site - Quality Assurance Project Plan* (Syracuse, NY: June 1993).
- BBEPC. 1993c. *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site - Data Management Plan* (Syracuse, NY: June 1993).
- BBEPC. 1993d. *Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site - Health and Safety Plan* (Syracuse, NY: June 1993).
- OSWER, 1992. *Guide for Conducting Treatability Studies under CERCLA*. EPA/540/R-92/071a. Office of Solid Waste and Emergency Response Directive No. 9380.3-10, November 1992.
- OSWER, 2002. *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites*. Memorandum from Marianne Lamont Horinko, Assistant Administrator to Superfund National Policy Managers, Regions 1 – 10 and RCRA Senior Policy Advisors, Regions 1-10. Office of Solid Waste and Emergency Response Directive No. 9285.6-08, February 12, 2002.

## ***Table***

---

**TABLE 1**  
**ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE**  
**TREATABILITY STUDY WORK PLAN**  
**POTENTIAL FEDERAL AND STATE ARARs AND TBCs**

Law/Regulation/Guidance	Citation	Description	Potential ARAR/TBC	Rationale
<b>FEDERAL ACTION/LOCATION-SPECIFIC ARARs AND TBCs</b>				
CWA - Toxic Pollutant Effluent Standards	40 CFR 129	Establishes effluent standard for toxic compounds including PCB (40 CFR 129.105). Applies to discharges to navigable waters.	ARAR	Applicable for remedial alternatives that would include discharge of water to the river.
Federal Power Act of 1920	16 USC 791a et. seq. 18 CFR 1-149	Authorizes the Federal Energy Regulatory Agency (FERC) to issue licenses for hydro-power dams.	TBC	Remedial alternatives involving alteration of dam operations would require consideration of existing permits.
CWA - Discharge to Waters of the United States	33 CFR 320-330 40 CFR 122 40 CFR 403-404 40 CFR 230 40 CFR 136 33 USC 1341, 1344	Establishes site-specific chemical limitations and performance standards designed to protect surface water quality. Types of discharges regulated under the CWA include discharge to surface water, indirect discharge to a POTW, and discharge of dredged or fill material into U.S. waters.	ARAR	May be relevant and appropriate for remedial alternatives involving treatment and/or discharge of water to the river, or placement of armoring materials in the river.
Rivers & Harbors Act	33 CFR 320-330	Prohibits unauthorized obstruction or alteration of any navigable water in the U.S. (dredging, filling, cofferdams, piers, etc.).	ARAR	Remedial activities may have to be conducted in such a way as to avoid obstruction or alteration of the river.
	33 CFR 322 33 USC 403	Requirement for permits affecting "navigable waters of the U.S."	ARAR	If excavation or capping activities are performed, the substantive requirements of the Act must be met for work affecting "navigable waters of the United States."
USEPA - two executive orders: 11990 - Protection of Wetlands 11988 - Floodplain Management.	40 CFR 6.302 40 CFR 6, App. A	Requires federal agencies, where possible, to avoid or minimize adverse impacts of federal actions upon wetlands/floodplains and enhance natural values of such.	TBC	Executive orders affect any work conducted in floodplains or wetlands.
Toxic Substances Control Act (TSCA)	40 CFR 761.120 - 761.135	Spill cleanup policy establishes cleanup criteria for spills after 5/4/87; soil cleanup levels: unrestricted access - 10 mg/kg, restricted access - 25 mg/kg. Guides treatment of PCB.	TBC	Although the presence of PCB at the Site is due to some releases after 5/4/87, the cleanup criteria may still be considered when evaluating remedial alternatives, especially given that most of the releases occurred much earlier.

**TABLE 1**  
**ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE**  
**TREATABILITY STUDY WORK PLAN**  
**POTENTIAL FEDERAL AND STATE ARARs AND TBCs**

Law/Regulation/Guidance	Citation	Description	Potential ARAR/TBC	Rationale
<b>FEDERAL ACTION/LOCATION-SPECIFIC ARARs AND TBCs (Continued)</b>				
TSCA	40 CFR 761	Provides regulations for storage and disposal of materials containing PCB, and for discharges of water containing PCB to navigable waters.	ARAR	Applicable for PCB-containing materials that are removed from the Site.
Clean Air Act	40 CFR 52	Establishes filing requirements and standards for constituent emission rates in accordance with National Ambient Air Quality Standards (NAAQS).	TBC	To be considered for remedial alternatives that include removal of sediment/soil.
OSHA - Hazardous Waste Operations and Emergency Response	29 CFR 1910.120	Establishes health and safety requirements for clean-up operations at NPL sites.	ARAR	Site is listed on NPL.
Fish and Wildlife Coordination Act	16 USC 661 et seq. 33 CFR 320-330	Requires that any federal agency that proposes to control or modify a body of water first consult with USFWS and state wildlife agency.	TBC	To be considered for capping and dredging alternatives.
National Historical Preservation Act	15 CFR 470 et seq.	Preservation of historic properties and landmarks.	TBC/ARAR	Becomes ARAR if activities will affect historic properties or landmarks in or near the Site.
National Archeological and Historical Preservation Act	36 CFR 65	Specifies requirements on actions to recover and preserve artefacts in areas where actions may cause irreparable harm, loss or destruction.	TBC/ARAR	Becomes ARAR if activities will affect archeological artifacts in or near the Site.
Endangered Species Act	50 CFR 402 16 USC 1531 et seq. 50 CFR 200	Requires federal agencies to ensure that the continued existence of any endangered or threatened species and their habitats will not be jeopardized by a site action.	TBC	Activities may disrupt or disturb endangered species.
USDOT Placarding and Handling	49 CFR 171	Transportation and handling requirements for materials containing PCB with concentrations of 20 mg/kg or more.	ARAR	This would apply to alternatives where sediment/soil are removed and transported from the Site.

**TABLE 1**  
**ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE**  
**TREATABILITY STUDY WORK PLAN**  
**POTENTIAL FEDERAL AND STATE ARARs AND TBCs**

Law/Regulation/Guidance	Citation	Description	Potential ARAR/TBC	Rationale
<b>STATE ACTION/LOCATION-SPECIFIC ARARs AND TBCs</b>				
Michigan Water Resources Commission Act (Part 31 of Act 451, Parts 8 and 21)	R323.1201-1221 R323.2101-2195	Establishes effluent standards in accordance with federal WPCA and CWA.	ARAR	Applicable for alternatives involving discharge of wastewater to the river.
Michigan NREPA (Part 201 of Act 451)	R324.20101-20140	Establishes rules specifying environmental response, risk assessment, remedial action, and site cleanup criteria.	ARAR	Applicable to remedial activities conducted at the Site.
Michigan Hazardous Waste Management Act (Part 111 of Act 451)	324.11101 - R324.11152	Establishes requirements for hazardous waste generators, transporters, and treatment/storage/disposal (TSD) facilities.	TBC	The Site is not a TSD facility nor a generator of hazardous wastes, although certain portions of the regulations may be useful as a means of determining handling/transportation requirements.
Michigan Geomaere-Anderson Wetland Protection Act (Part 303 of Act 451)	324.30301 - 324.30323	Establishes the rules regarding wetland uses for protection of state wetland areas.	ARAR	For certain remedial alternatives, these regulations may limit potential work and/or storage areas.
Michigan Inland Lakes and Streams Act (Part 301 of Act 451)	R324.30102-30104	Regulates dredging or filling of lake or stream bottoms.	ARAR	For certain remedial alternatives, activities may be restricted by these regulations.
Michigan Soil Erosion and Sedimentation Control Act (Part 91 of Act 451)	R323.1701-1714 R324.9112	Establishes rules prescribing soil erosion and sedimentation control plans and measures.	ARAR	A soil erosion and sedimentation control plan may be required to perform earth changes.
Michigan Water Resources Commission Act (Part 31 of Act 451)	R323.2204-R323.2207	Establishes the rules regarding water and wastewater discharge provisions for the nondegradation of groundwater quality, uses of groundwater.	TBC	If remedial alternatives involve discharge of waters or waste to groundwater or the ground.
Michigan Wastewater Reporting Regulations	R299.9004	Requires discharge reporting on the part of any wastewater discharger other than of sanitary sewage to a sewer system.	TBC	Applicable to any alternatives involving discharge of wastewater.
Michigan Water Resources Protection Act	R324.3101-3111	Establishes permit requirements for alteration of floodplains, discharges to surface waters.	ARAR	Applicable if remedial alternatives involve construction in floodplains.
Michigan Occupational Safety and Health Act (MIOSHA-Act 154)	Act 154 of 1974 as amended (parts 1-49)	Establishes the rules for safety standards in the workplace.	ARAR	For certain remedial alternatives, activities may be restricted by these regulations.



TABLE 1

## ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER SUPERFUND SITE

TREATABILITY STUDY WORK PLAN  
POTENTIAL FEDERAL AND STATE ARARs AND TBCs

Law/Regulation/Guidance	Citation	Description	Potential ARAR/TBC	Rationale
<b>STATE ACTION/LOCATION-SPECIFIC ARARs AND TBCs (Continued)</b>				
Michigan Air Pollution Act (Part 55 of Act 451)	R336.1101-2706	Establishes rules prohibiting the emission of air contaminants in quantities that cause injurious effects to human health, animal life, plant life of significant economic value, and/or property.	TBC	For certain remedial alternatives, dust emissions may need to be monitored.
Michigan Endangered Species Act (Part 365 of Act 451)	R324.36501-36507	Establishes rules to provide for conservation, management, enhancement, and protection of species either endangered or threatened with extinction.	TBC	For certain remedial alternatives, activities may disrupt or disturb endangered species.
Michigan Solid Waste Management Regulations (Part 115 of Act 451)	R324.11501-11550 R299.4401-4454	Establishes rules for solid waste disposal facilities.	ARAR	Would apply to an measures involving landfill operation.

## ***Figures***

---



# **BBL Bank Locations**

- 0-5 mg/kg
- 5-20 mg/kg
- 20-50 mg/kg
- 50+ mg/kg
- Candidate Stabilization Areas
- Distance Markers
- - - Extent of Former Impoundment

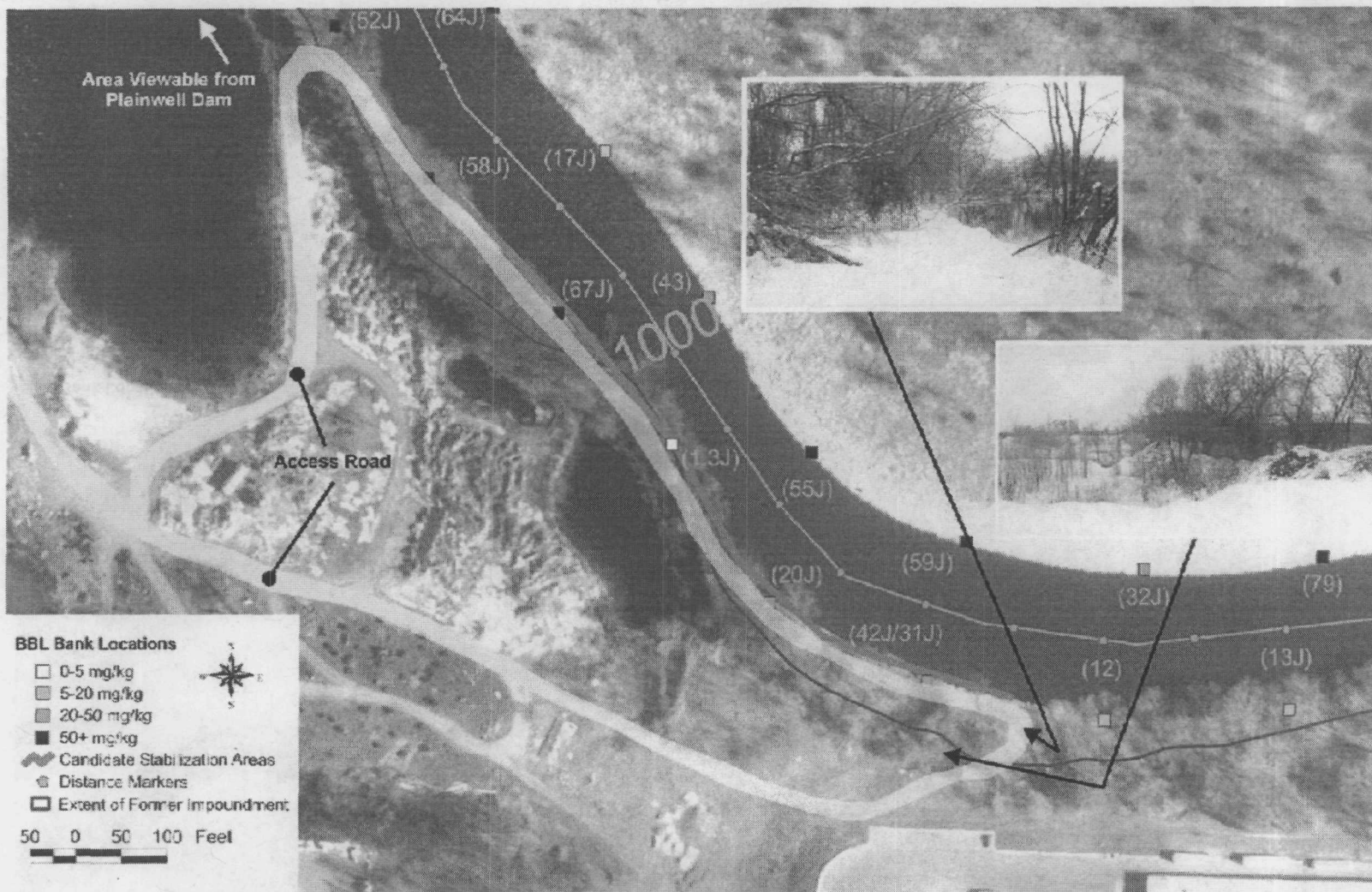
500 0 500 Feet

Kalamazoo River Study Group  
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site  
Treatability Study Work Plan

**RIVERBANK STABILIZATION PILOT  
PROJECT OPTIONS 2-5**

**BBL**  
BLASLAND, BOUCK & LEE, INC.  
engineers, scientists, economists

FIGURE  
**1**



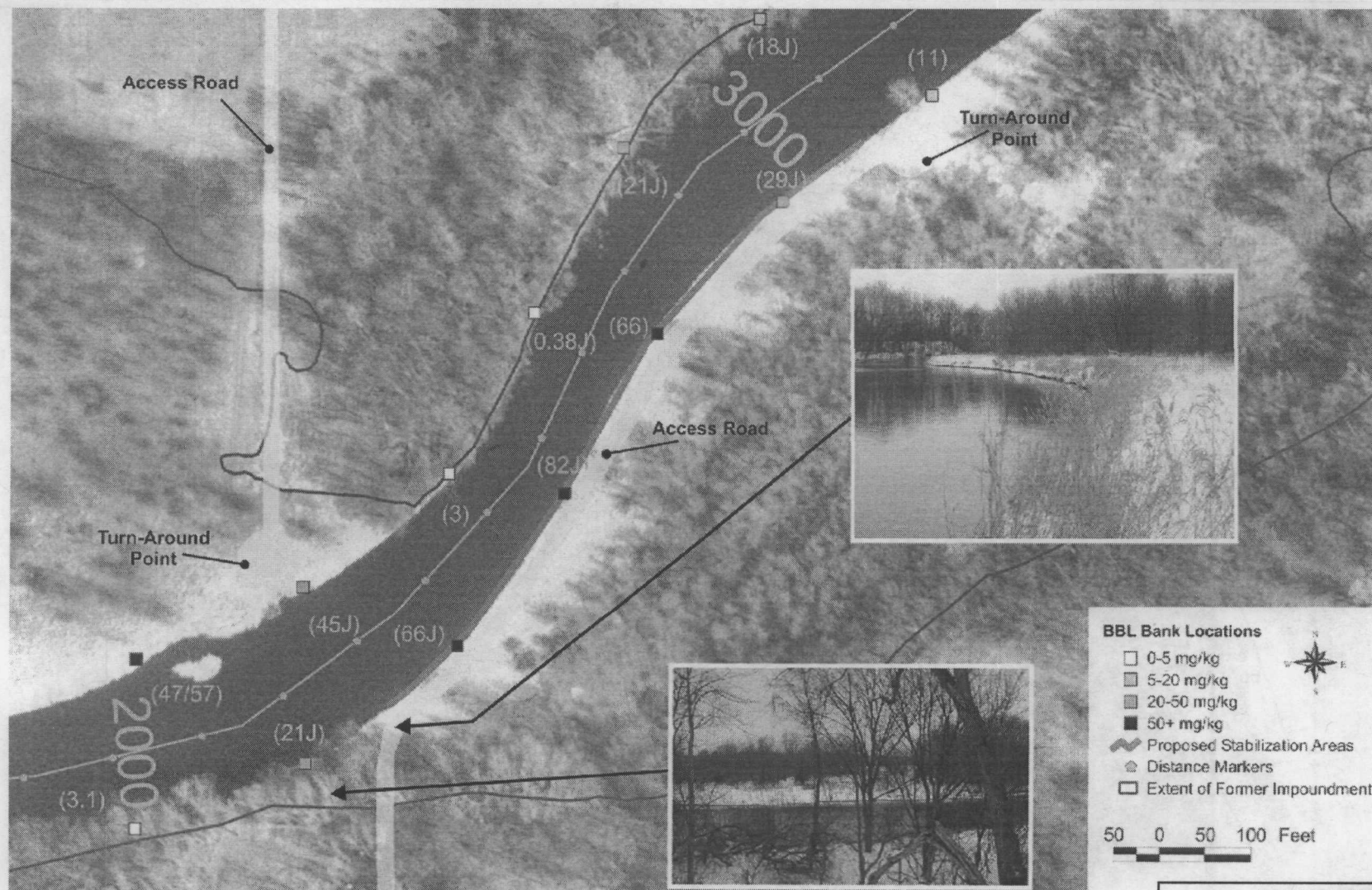
Kalamazoo River Study Group  
 Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site  
 Treatability Study Work Plan

# RIVERBANK STABILIZATION PILOT PROJECT OPTION 2

**BBL**  
 BLASLAND, BOUCK & LEE, INC.  
 engineers, scientists, economists

FIGURE  
 2



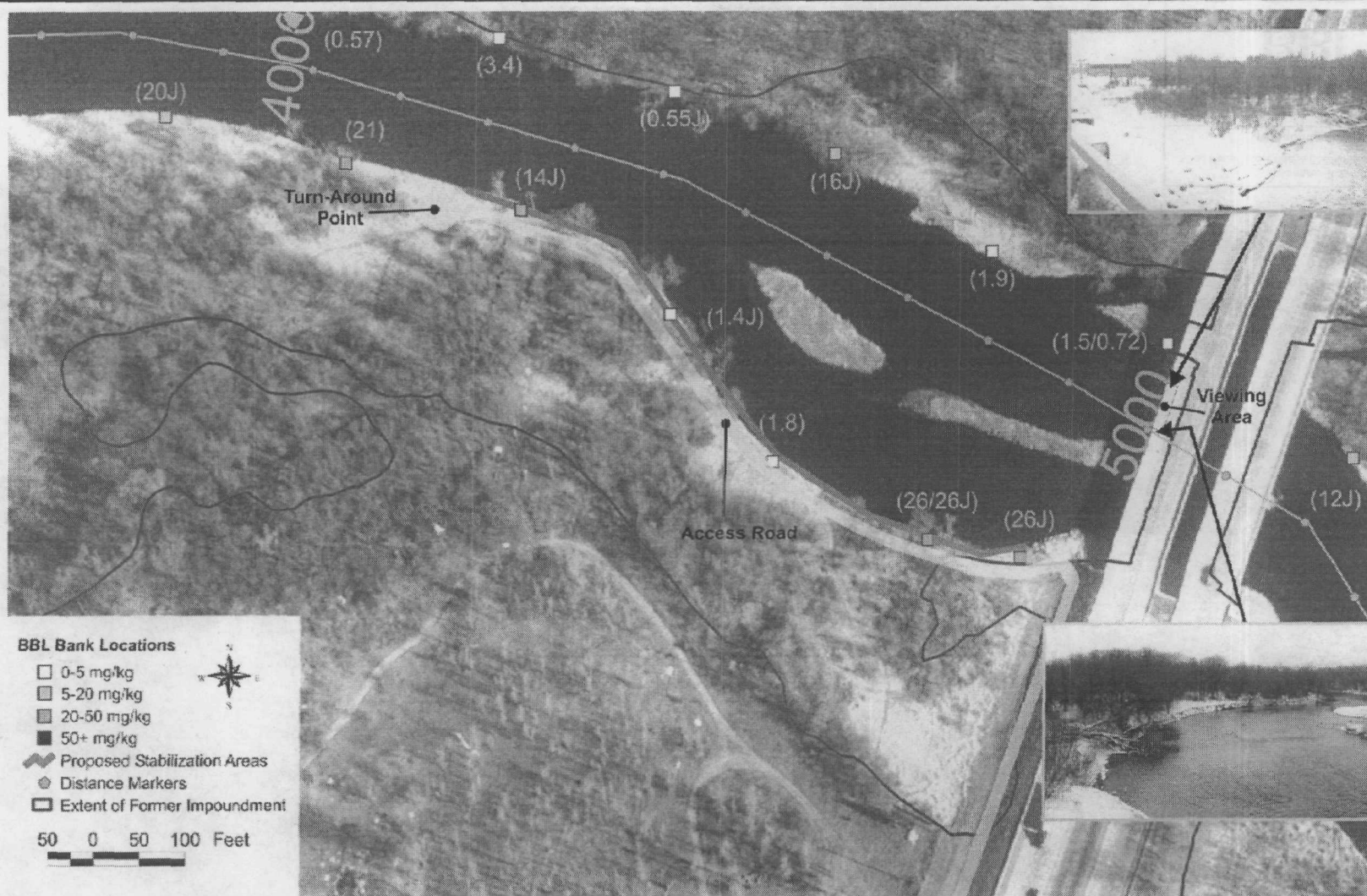


Kalamazoo River Study Group  
 Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site  
 Treatability Study Work Plan

**RIVERBANK STABILIZATION PILOT  
 PROJECT OPTION 3**

**BBL**  
 BLASLAND, BOUCK & LEE, INC.  
 engineers, scientists, economists

FIGURE  
**3**



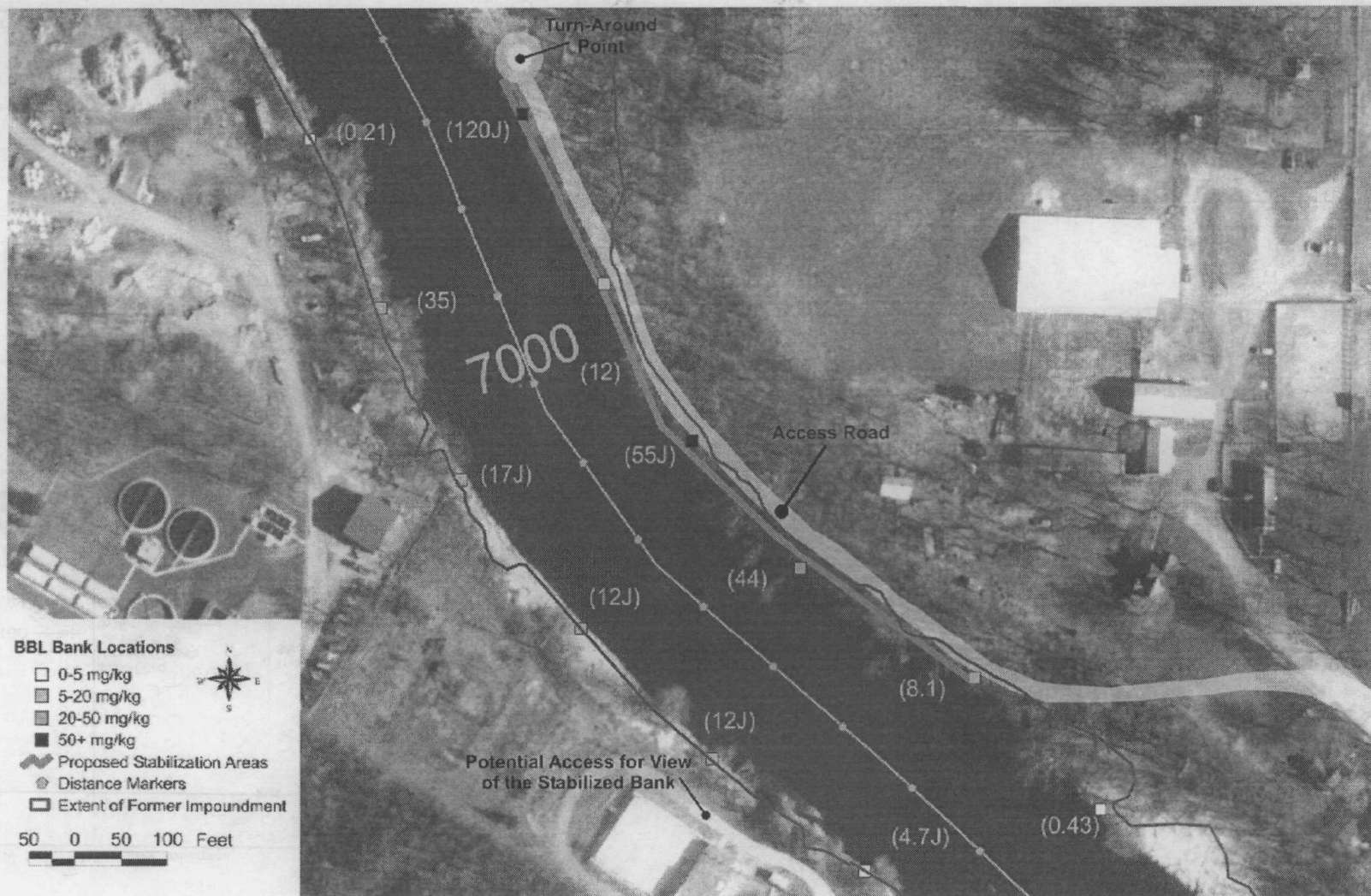
Kalamazoo River Study Group  
 Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site  
 Treatability Study Work Plan

RIVERBANK STABILIZATION PILOT  
 PROJECT OPTION 4

**BBL**  
 BLASLAND, BOUCK & LEE, INC.  
 engineers, scientists, economists

FIGURE  
 4



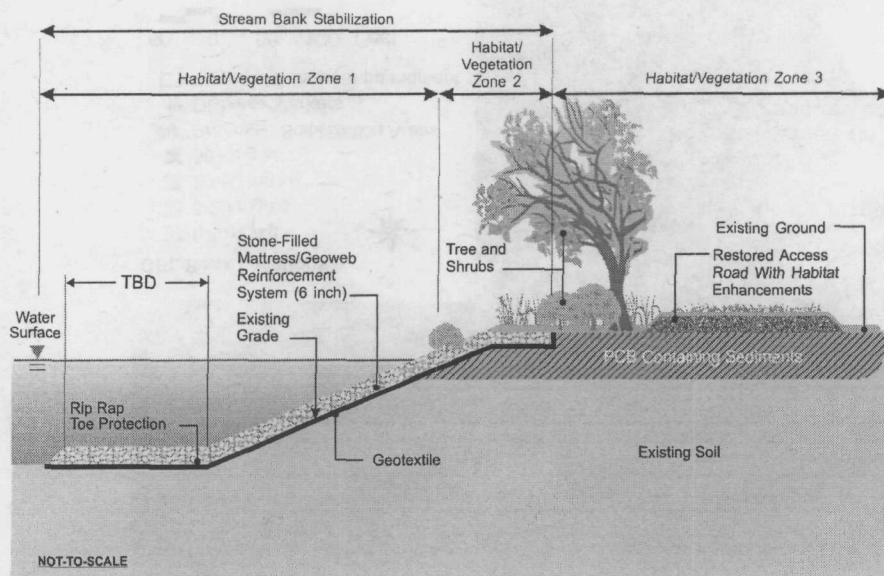


Kalamazoo River Study Group  
 Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site  
 Treatability Study Work Plan

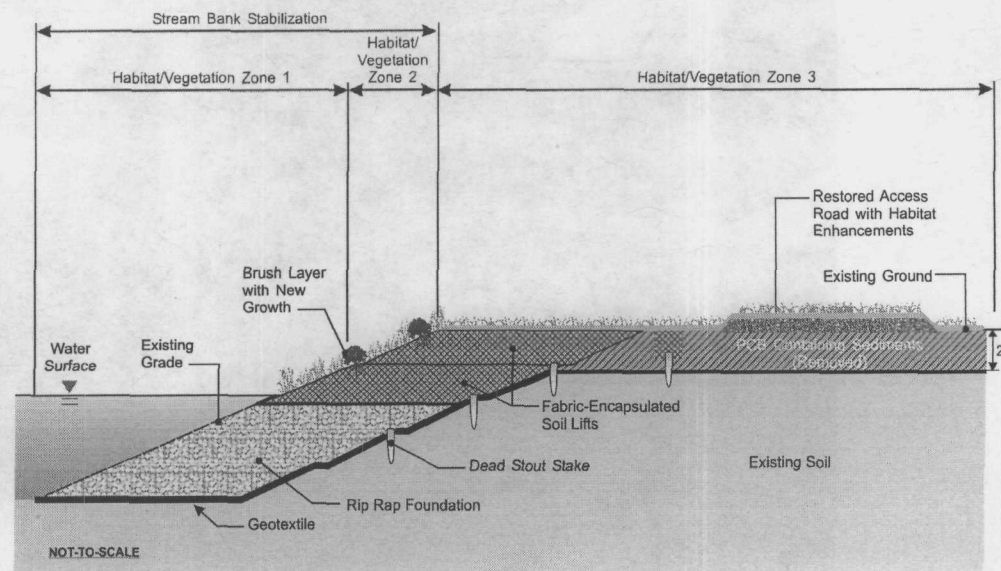
**RIVERBANK STABILIZATION PILOT  
 PROJECT OPTION 5**

**BBL**  
 BLASLAND, BOUCK & LEE, INC.  
 engineers, scientists, economists

FIGURE  
**5**



**A: GEOWEB  
STABILIZATION METHOD**



**B: FABRIC-ENCAPSULATED SOIL  
STABILIZATION METHOD**

KALAMAZOO RIVER STUDY GROUP  
ALLIED PAPER, INC./PORTAGE CREEK/KALAMAZOO RIVER  
SUPERFUND SITE  
TREATABILITY STUDY WORK PLAN

BANK STABILIZATION METHODS

**BBL**  
BLASLAND, BOUCK & LEE, INC.  
engineers, scientists, economists

FIGURE  
6



U.S. Fish & Wildlife Service  
National Oceanic & Atmospheric Administration  
Michigan Attorney General's Office  
Michigan Department of Environmental Quality  
Michigan Department of Natural Resources

**U.S. Environmental  
Protection Agency**  
*Shari Kolak,  
Remedial Project Manager*

**Kalamazoo River Study Group**  
*Mark Brown, Ph.D.,  
Project Coordinator*

**Engineering Design**  
BBL, Inc.  
*Steve Garbaciak, P.E.,  
Lead Engineer*

**Construction**  
BBL Environmental Services, Inc.  
*Richard DiFiore,  
Construction Manager*

**BBL, Inc.**  
Engineering & Scientific  
Support

**Limno-Tech, Inc.**  
Hydraulic Analyses  
Design Support

**Terra Contracting**  
*Steve Taplin,  
Primary Contractor*

Kalamazoo River Study Group  
Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site  
**Treatability Study Work Plan**

**ORGANIZATION CHART**

**BBL**<sup>®</sup>  
BLASLAND, BOUCK & LEE, INC.  
*engineers, scientists, economists*

**FIGURE  
7**

## ***Attachment A***

---

### **Former Plainwell Impoundment Treatability Study Work Plan Project Schedule**



## ***Attachment B***

---

# **Scope of Work for Geotechnical Sampling Analysis**

**Scope of Work for Geotechnical Sampling and Analysis  
Former Plainwell Impoundment  
Riverbank Stabilization Treatability Study**

**Introduction and Objectives:**

Under the direction of the U.S. Environmental Protection Agency, the Kalamazoo River Study Group plans to conduct a riverbank stabilization treatability study (Treatability Study) to be conducted within a portion of the former Plainwell Impoundment area of the Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site. The proposed Treatability Study program involves construction of bank stabilization measures along a selected length of the Kalamazoo River in Allegan County, Michigan. The objectives and primary details of the pilot study are described in the draft final Treatability Study Work Plan (Blasland, Bouck & Lee, Inc., April 29, 2004).

Subsurface geotechnical data will be obtained to determine certain soil parameters that will be used in the design of the stabilization techniques, and to permit assessment of the long term stability and serviceability of the proposed program.

**Data Requirements**

Soil sample geotechnical data are required to facilitate the design of the pilot study as follows:

1. *Soil Classification Data* – Soil samples will be collected for analysis of particle size distribution and Atterberg Limits. These data are generally used for two purposes:
  - Engineering description of soils; and
  - To estimate the likely range of strength and compressibility of the soil. These data, in turn, serve to facilitate verification of the actual laboratory measurements.
2. *Density and Compaction Data* – Soil samples will be collected and analyzed for in-situ density, moisture content, and modified compaction. These data will be used in engineering specifications and to provide additional information on the expected behavior of the soil under load.
3. *Strength Data* – Soil samples will be collected for analysis of friction angle, cohesion, and undrained strength. These data will be used in slope stability calculations utilizing SLOPE/W to assess the short-term and long-term stability of the constructed slopes.
4. *Compressibility Data* – Soil sample consolidation data will be used to assess the settlement of the native soil under the load of the constructed sideslope materials.

**Field Investigation**

Soil borings will be advanced in the proposed work area using track-mounted and pontoon boat-mounted drill rigs. A BBL engineer or technician will be present to log the boreholes and to select samples for laboratory investigations. The work will be conducted in a manner designed to limit the potential disturbance of vegetation.

*Top of Riverbank* - A track-mounted drill rig will be used to drill and sample ten (10) boreholes at a spacing of approximately 100 feet on the top of the riverbank. Each on-shore borehole will be drilled using hollow stem auger (HSA) to a 30-foot depth or prior refusal. The borings will be sampled using SPT, and blow-counts will be recorded continuously to 10 feet below surface, and at every 5 feet thereafter. Up to three (3) boreholes may be selected for continuous sampling. Relatively undisturbed samples will be collected using Shelby tubes at depths of 5, 10, 15, and 20 feet below grade in 5 of the 10 boreholes. The boreholes will be backfilled with a tremie-pipe injected bentonite grout mix. Drill cuttings will be drummed and temporarily staged on site at a location above the 100-year flood elevation pending transport off-site for disposal.

Laboratory analysis will include the geotechnical testing by ASTM methods as shown in the table below. Actual tests will be assigned depending on conditions encountered in the field and the success of recovering undisturbed soil and sediment samples.

Laboratory test	Method	Number of Tests
Grain Size	ASTM D 422	30 tests (select 3 samples per hole)
Atterberg Limits	ASTM D 4318	10 tests (select 1 typical sample per hole)
Density/Moisture Content	ASTM D 2937	20 tests (select 2 undisturbed samples per hole)
Direct Shear Test	ASTM D 3080	10 tests, 3 normal loads each (select 1 sample per hole)
Triaxial Test	ASTM D 4767	10 tests (UU procedure), 3 cell pressures each (select 1 sample per hole)
Consolidation Test	ASTM D 2435	3 tests, 5 load steps each (select samples in field)

*Toe of Riverbank* - A boat-mounted rig will be used to drill four (4) borings at the toe of the bank using HSA within a steel casing. Ten-inch steel casing will be driven incrementally ahead of 4¼-inch inner diameter HSA to a total depth of 10 feet below sediment surface. Relatively undisturbed sediment/soil samples will be collected using Shelby tubes at depths of 2.5, 5, 7.5 and 10 feet below mudline in each borehole. Alternate sampling methods, such as split spoon, may be used depending on adequacy of sample recovery.

Laboratory analysis will include the geotechnical testing by ASTM methods as shown below. Actual tests will be assigned depending on conditions encountered in the field and the success of recovering undisturbed soil and sediment samples.

Laboratory test	Method	Number of Tests
Grain Size	ASTM D 422	12 tests (select 3 samples per hole)
Atterberg Limits	ASTM D 4318	4 tests (select 1 typical sample per hole)
Density/Moisture Content	ASTM D 2937	8 tests (select 2 undisturbed samples per hole)
Direct Shear Test	ASTM D 3080	4 tests, 3 normal loads each (select 1 sample per hole)
Triaxial Test	ASTM D 4767	4 tests (UU procedure), 3 cell pressures each (select 1 sample per hole)

### **Piezometer Installation**

Two pairs of two piezometers will be installed upstream and downstream of the planned construction area. Each pair will consist of one piezometer installed within approximately 5 feet of the top-of-bank, and one piezometer approximately 50 feet away, perpendicular to the river. Actual locations of the piezometers will be determined in the field. The piezometers will be constructed of 1-inch diameter PVC riser with 2-foot long 0.010-inch slotted screen, installed to a depth approximately 1 foot below the water table. The filter pack will extend to approximately 6 inches above the screen, and bentonite chips will be placed within the annulus to grade. Vented

PVC caps will be placed on top of each piezometer. Modifications to the piezometer construction approach may be made based upon conditions encountered in the field.

## **References**

Blasland, Bouck & Lee, Inc., 2004. Draft Final *Former Plainwell Impoundment Treatability Study Work Plan*. Allied Paper, Inc./Portage Creek/Kalamazoo River Superfund Site Kalamazoo and Allegan Counties, Michigan. April 29, 2004.